Massachusetts Department of Environmental Protection
Source Water Assessment and Protection (SWAP) Report
For
The Options Institute & Fellowship

What is SWAP?

The Source Water Assessment and Protection (SWAP) program, established under the federal Safe Drinking Water Act, requires every state to:

- Inventory land uses within the recharge areas of all public water supply sources;
- Assess the susceptibility of drinking water sources to contamination from these land uses; and
- Publicize the results to provide support for improved protection.

SWAP and Water Quality

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Prepared by the Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program

Date Prepared:
February 23, 2004

Table 1: Public Water System (PWS) Information

PWS Name	The Options Institute & Fellowship
PWS Address	2080 South Undermountain Road
City/Town	Sheffield, Massachusetts
PWS ID Number	1267008
Local Contact	Mr. Adam Wadell
Phone Number	413-229-3788

Source Name	*Source ID#*	*Zone I (in feet)*	*IWPA (in feet)*	*Source Susceptibility*
Well #3	1267008-03G	301	889	Moderate
Well #4	1267008-04G	116	428	Moderate
Well #5	1267008-05G	131	436	High

Introduction

We are all concerned about the quality of the water we drink. Drinking water supplies may be threatened by many potential sources of contamination, including septic systems, road deicing, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:
This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination, the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes:
1. Description of the Water System
2. Discussion of Land Uses within Protection Areas
3. Recommendations for Protection
4. Attachments, including a Map of the Protection Areas

1. Description of the Water System

The Options Institute & Fellowship (Options) is located on South Undermountain Road in the town of Sheffield in southwestern Massachusetts and Salisbury, Connecticut. The facility is located on approximately 95 acres of land. The main Options facility is a treatment and training center founded in 1983 for adults to develop self-direction and

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by the water supplier and limited to water supply activities.
- **The IWPA** is the larger area that is likely to contribute water to the well.

In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

empowerment. The facility also includes the Autism Treatment Center of America for autistic children and adults on an adjacent property east of Route 41. Sheffield is a small rural residential community that has a public water system, however the system does not serve the area where Options is located. There is no municipal wastewater treatment facility in Sheffield. Options is therefore served by on-site water supply wells and wastewater is discharged to a common septic system for the main complex and a small septic system at the Son-Rise building.

The facility's population fluctuates but has the capacity for 50 staff and over 55 clients per day. Visitors and volunteer staff may attend the institute for one week to eight weeks. The facilities include the main house, several residential and teaching facilities, a fitness center, a cafeteria and maintenance facilities.

The facility maintains five wells on site. Water is supplied to the various facilities by three sources: Wells #3 (03G), #4 (04G) and #5 (05G). Wells #1 (01G) and #2 (02G) are located in the front yard adjacent to the Main House but those two wells are severed from the system, designated as emergency wells and are currently used only for irrigation. Emergency wells will not be further addressed in this report. Well #3 was approved in 1991 to replace Wells #1 and #2 as part of an expansion of the facility. Well #3 was permitted by the DEP through the New Source Approval Process and was installed and tested in accordance with current regulations. Well #3 is a 435-feet deep bedrock well located approximately 300 feet from the Mountain House cafeteria and two new residential/classroom buildings. Well #3 provides water for the Main House, the Mountain House, the two new mountainside facilities, the Ice House, the Boat House, and the Options House. Well #4 is a 6-inch diameter well drilled into the bedrock aquifer located at the Son-Rise building on the east side of Route 41. The Son-Rise building houses the staff and clients for the Autism Treatment Center for America. The facility has two units for clients and facilities for day staff and clients. There is no information regarding the depth or construction of the well. Well #5 (05G) is a 6-inch diameter well located south of the Connecticut state line that is located immediately adjacent to (within 20 feet of) the Staff House. Well #5 is newly registered as a public water supply well and there is no information regarding the depth or construction of the well. The well serves the administration building (the Lama Barn) and three residential buildings (the Staff House, the Ravine House and the Woodland House). One underground fuel oil storage tank was observed approximately 100 feet from the well at the Staff House and according to Options staff, each of the resident halls served by Well #5 has a UST for fuel oil.

Table 2: Table of Activities within the Water Supply Protection Areas

Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Non-conforming Zone I	04G and 05G	-	-	Contact DEP prior to conducting any work within Zone I or expanding facilities.
Transportation corridors/parking	04G and 05G	All	Moderate	Manage stormwater and limit road salt usage.
Underground storage tank (fuel oil)	05G	05G	High	Use BMPs for fuel oil storage and delivery. Upgrade or convert to propane as is feasible.
Aboveground storage tank (fuel oil)	04G	All	Moderate	Use BMPS for fuel oil storage and delivery.
Institutional uses	05G	All	Moderate	Provide BMPs for household hazardous waste management. Use IPM for lawn maintenance.
Septic system components	05G	All	Moderate	The leachfield and some components are within the protection areas.

*** -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - www.state.ma.us/dep/brp/dws/.**

Glossary

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. To determine your Zone I radius, refer to the attached map.

IWPA: A 400-foot to ½ mile radius around a public water supply well proportional to its pumping rate; the area DEP recommends for protection in the absence of a defined Zone II. To determine IWPA radius, refer to the attached map.

Zone II: The primary recharge area defined by a hydrogeologic study.

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

The Zone I is the area immediately around the wellhead while the Interim Wellhead Protection Area (IWPA) is a larger area that likely contributes water to the well. The Zone I area is the most protected area and DEP regulations allow only water supply related activities or other non-threatening activities within the Zone I. The IWPA is only an interim protection area; the actual area of contribution to the wells may be smaller or much larger than the IWPA. The Zone I and IWPA radii for the facility's wells are as follows: Well #3 – Zone I is 301 feet and IWPA is 889 feet based on an approved withdrawal rate of 22,000 gpd; Well #4 – Zone I is 116 feet and IWPA is 428 feet based on Title 5 flow estimates from the building usage. The Zone I and IWPA for the newly registered Well #5 are 131 and 436 feet based on an estimated Title 5 flow of 1,600 gallons per day from the well. These protection areas may be adjusted to be larger or smaller based on actual metered water use once that information becomes available. Please refer to the attached map that shows the Zone I and IWPA radii.

The complex is located in an area where geologic mapping indicates thin till overburden covering the bedrock. However, the well log for Well #3 indicates 161 feet of casing set 74 feet into bedrock. The driller's log indicates 5 feet of "dirt", 86 feet of "hardpan" (till) and 34 feet of "decayed" rock. The geologic mapping of the area indicates a bedrock contact at the site indicating the bedrock at Well #3's location as quartzose argillite of the Mount Everett Formation with the bedrock at the location of Well #4 and #5 mapped as marble of the Stockbridge Formation. Water from wells #3 and #4 is treated through a softener prior to use and water from Well #3 passes through an ultraviolet lamp prior to distribution because of historical detections of bacteria when the well was first installed. There is no evidence of an extensive protective till or clay layer in the vicinity of the wells. Wells drilled in these conditions are considered highly vulnerable to potential contamination from the ground surface because there is no significant hydrogeologic barrier, such as clay, to prevent surface contamination from migrating into the bedrock aquifer.

Public water suppliers are required to regularly monitor water quality from all sources at the facility. For current information on monitoring results, please refer questions to the water supply contact listed above in Table 1.

2. Discussion of Land Uses in the Protection Areas

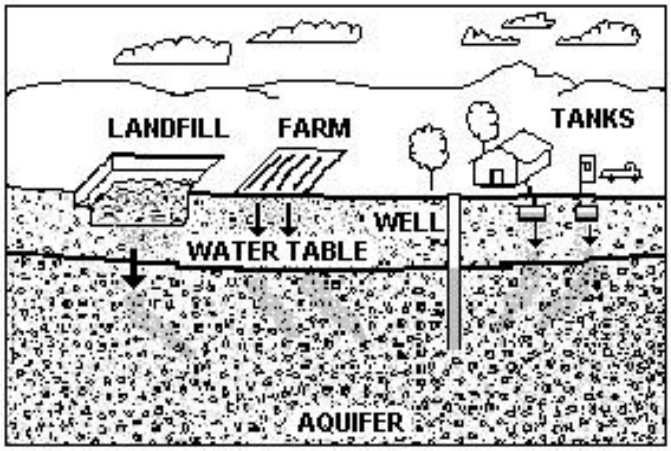

Figure 1: Example of how a well could become contaminated by different land uses and activities.

There are land uses and activities within the drinking water supply protection areas that are potential sources of contamination.

Key issues include:

1. **Non-conforming Zone I;**
2. **Institutional use;**
3. **Transportation corridors/parking;**
4. **Underground/Aboveground storage tanks; and**
5. **Hazardous materials storage and use.**

The overall ranking of susceptibility to contamination for the well is high based on the presence of high threat land uses or activities in the Zone I of Well #5 as seen in Table 2. However, the main well for the facility (Well #3) is conforming with respect to DEP regulations and has a moderate threat ranking based on moderate threat land uses within the IWPA of the well. There are several moderate threat land uses and activities in the Zone I and IWPA of Well #4.

For More Information:

Contact Catherine Skiba in DEP's Springfield Office at (413) 755-2119 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on the Drinking Water Program web site at: www.state.ma.us/dep/brp/dws/

Additional Documents:

To help with source protection efforts, more information is available by request or online at www.state.ma.us/dep/brp/dws, including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

Copies of this assessment have been made available to the public water supplier and town boards.

1. Non-conforming Zone I – The water supplier does not own the entire Zone I area for Well #4 and although it does own the Zone I for Well #5, there are numerous activities within the Zone I that are non-conforming. Facility components include fuel storage, transformers, buildings, sewer lines, and parking are within the Zone I of wells #4 and #5. Systems not meeting DEP Zone I requirements for ownership or control or that have non-conforming activities within Zone I must receive DEP approval and address Zone I issues prior to increasing water use or modifying systems/facilities.

Zone I Recommendations:

- Prohibit any non-water supply activities within Zone I and, where feasible, remove non-conforming activities within the Zone I areas.
- Do not use or store pesticides or fertilizers in Zone I.
- Inspect the wells regularly to ensure the cap is secure, there is no standing water near the wells and that runoff cannot infiltrate around the well casings.
- Relocate the wells if they cannot be secured or if water quality is impaired by activities near the wells.
- Monitor all activities associated with petroleum products within the Zone Is and replace USTs as feasible or appropriate.

2. Institutional use – The Options Institute consists of land uses that are common to high-density residential uses. The facility utilizes on-site septic disposal systems and some components are within the Zone I and/or IWPA of one or more of the sources. The facility utilizes both propane and fuel oil for heating with both ASTs and USTs used. At least one fuel oil UST is within the Zone I of Well #5. Although the facility is not a registered hazardous waste generator, the maintenance staff utilizes and stores small quantities of household hazardous materials, e.g. stains, paints and cleaning materials. If managed improperly, activities associated with institutional uses can contribute to drinking water contamination. Stormwater drainage, roadway drainage and parking areas all pose a potential threat to the water supplies if accidental release of petroleum products occurs. Common potential sources of contamination include:

- **Septic Systems** – Improper disposal of household hazardous chemicals to septic systems is a potential source of contamination to the groundwater because septic systems lead to the ground. If septic systems fail or are not properly maintained, they could be a potential source of microbial contamination.
- **Hazardous Materials** - Hazardous materials may include automotive wastes, paints, solvents, pesticides, fertilizers, and other substances. Improper use, storage, and disposal of chemical products used in homes are potential sources of contamination.
- **Heating Oil/Kerosene Storage** - If managed improperly, Underground and Aboveground Storage Tanks (USTs and ASTs) and their associated piping can be potential sources of contamination due to leaks or spills of the fuel oil/kerosene they store.
- **Stormwater** – Catch basins transport stormwater from roadways and adjacent properties to the ground. As flowing stormwater travels, it picks up debris and contaminants from streets and lawns. Common potential contaminants include lawn chemicals, pet waste, and contaminants from automotive leaks, maintenance, washing, or accidents.

Institutional Land Use Recommendations:

- Promote BMPs for stormwater management and pollution controls. Monitor all activities associated with the petroleum products, especially delivery.
- Have spill containment/absorbent materials available on-site
- The facility utilizes fuel oil as well as propane for a heating source. Containment of the fuel system to prevent accidental releases to the basements and ground should be reviewed in the buildings. Fuel tanks should be within containment to protect floor drains, cracked floors or walls that could act as conduits if fuel oil leaks or is spilled from the storage tanks. Contact the regional DEP staff from the UIC program (Rick Larson 413-755-2207) for advice regarding protecting any

floor drains or potential conduits to the ground. Oil lines from the tank to the boiler should be sleeved so that any leaks would drain back to the tank or minimal oil would leak to the room. Prepare a policy and a plan for maintenance operations, especially when oil filters are changed. DEP recommends that you require your boiler maintenance contractor use containment, protect any drains and have absorbent materials on hand to prevent accidental leaks while conducting routine maintenance. The contractor should be responsible for the off-site disposal of any boiler blow down generated during maintenance.

- Continue the use of Best Management Practices for all activities at the facility. Consider drought resistant grasses and/or low release nutrient fertilizers in the IWPA, as required.
- Investigate Integrated Pest Management and Best Management Practices within the Zone I and IWPA.
- Use secondary containment as necessary for any petroleum products kept for maintenance and lawn care equipment.
- Use Best Management Practices for handling treatment chemicals and vehicles used to access the area. Do not use or store pesticides or fertilizers within Zone I.
- Review your emergency response plan regarding accidental releases within the protection areas. Ensure that emergency responders in town are aware of the locations of your resource areas.

3. Transportation corridor/parking – The facility's internal corridors and South Undermountain Road are within the protection areas. Accidents and normal use and maintenance of corridors and parking areas may pose a potential threat to water quality. Catch basins transport stormwater from roadways and adjacent properties to the ground, streams, rivers or reservoir. As flowing stormwater travels, it picks up de-icing materials, petroleum chemicals and other debris on roads and contaminants from streets and lawns. Common potential contaminants in stormwater originate from automotive leaks, automobile maintenance and car washing, accidental spills, as well as, waste from wildlife and pets.

Recommendations:

- Prepare an Emergency Response Plan that includes coordination among town emergency responders to be sure they area aware of the location of your well and the protection areas.

4. Underground/Aboveground petroleum storage tanks – According to Options' staff, there are at least two underground fuel oil tanks and several aboveground tanks within the protection areas of Wells #4 and #5. If managed improperly, fuel oil tanks and their associated piping can be a potential source of contamination due to leaks or spills of the materials they store.

Recommendation:

- Replace older USTs with propane as is feasible or upgrade tanks in accordance with applicable regulations for storage tanks. Any modifications to the tanks must be accomplished in a manner consistent with Massachusetts's plumbing, building, and fire code requirements. Consult with the local fire department for any additional local code requirements regarding ASTs and USTs. For those tanks that are located within the State of Connecticut contact officials in Connecticut to determine appropriate regulatory requirements.
- Monitor all activities associated with the petroleum products, especially delivery.
- Provide containment for the tanks and sleeve the fuel lines.
- Have spill containment/absorbent materials available on-site.
- Seal all cracks in the floor and any floor drains if they cannot be adequately protected to prevent a prohibited discharge.

5. Hazardous Materials storage and use – The facility utilizes hazardous materials for maintenance. The floor drains in the maintenance building were sealed at the time of the assessment and there is no water to the building and therefore no wastewater disposal. Hazardous materials such as paint, thinners, petroleum products, etc. should be kept in containment and used with caution. Cleaning and disposal should not be through any septic system on the site. Spill kits and signs designating areas of storage should be available. If hazardous materials are improperly stored, used, or disposed, they become potential sources of contamination. Hazardous materials should <u>never</u> be allowed to enter a catch basin, or floor drain leading directly to the ground. Review the attached fact sheet for additional information regarding the thresholds for triggering a very small quantity hazardous waste generator.

Hazardous Materials Storage and Use Recommendations:

- Continue current management of hazardous materials on site and consider relocation of the well to minimize any potential threat from an accidental release at the site.
- Continue to use BMPs for fuel oil storage, hazardous material handling, storage, disposal, and emergency response planning.
- Ensure that management plans are up to date and staff review BMPs for the handling of hazardous materials.

Implementing the following recommendations will reduce the system's susceptibility to contamination.

3. Protection Recommendations

Implementing protection measures and best management practices (BMPs) will reduce the wells' susceptibility to contamination. Review and adopt the key recommendations above and the following:

Zone I:

- ✓ Keep non-water supply activities out of the Zone I.
- ✓ Conduct regular inspections of the Zone I.
- ✓ Replace the well cap on Well #5 and prevent runoff from infiltrating around Well #3.
- ✓ Remove or upgrade fuel oil USTs as feasible.

Facilities Management:

- ✓ For utility transformers that may contain PCBs, contact the utility to determine if PCBs have been replaced. If PCBs are present, urge their immediate replacement. Keep the area near the transformer free of tree limbs that could endanger the transformer in a storm.
- ✓ Educate the staff and control the use of hazardous materials in the Zone I.
- ✓ Continue to minimize the use of fertilizers and pesticides.
- ✓ Monitor fuel oil delivery and use to prevent releases.

Planning:

- ✓ Work with your community to develop and include your IWPAs in an aquifer protection district along with other public water supplies in town.
- ✓ Have a plan to address short-term water shortages and long-term water demands. Keep the phone number of a bottled water company readily available.
- ✓ Continue long term planning for the system that includes maintenance of the water and wastewater systems.

These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to encourage discussion of local drinking water protection measures.

4. Attachments

- Map of the Public Water Supply (PWS) Protection Areas
- Recommended Source Protection Measures Fact Sheet